

Patent Claims

1. Radiometric measuring device for mounting at a container
(3) fillable with a filling substance (1), comprising
5 - a radioactive source (5), which, in operation, sends
radioactive radiation through the container (3),
- at least two detectors (D_i),
--which serve for registering radiation passing through the
container (3) and for producing an electrical pulse rate
10 (N_i) corresponding to the registered radiation,
- offset generators (19), which superimpose on the pulse rate
(N_i) of each detector (D_i) an offset (O_i) representing a
status of such detector (D_i), and
- a collector line (21),
15 --to which each detector (D_i) feeds an output signal
corresponding to the superimposing of its pulse rate (N_i)
and its offset (O_i),
--which feeds to a superordinated unit (23) a sum signal
corresponding to the superimposing of the output signals,
20 ---with the superordinated unit (23) deriving, on the basis
of the sum signal, a measurement signal and/or a status
of the measuring device.
2. Radiometric measuring device for mounting at a container
25 (3) fillable with a filling substance (1), comprising
- a radioactive source (5), which, in operation, sends
radioactive radiation through the container (3),
- at least two detectors (D_i),
--which serve for registering radiation passing through the
30 container (3) and for producing an electrical pulse rate
(N_i) corresponding to the registered radiation,
- offset generators (19), which superimpose on the pulse rate
(N_i) of each detector (D_i) a detector-specific offset (O_{di}),
- turn-off switches (33), which serve for suppressing

transmission of pulse rate (N_i) and offset (O_{di}), when a detector (D_i) malfunctions,

- a collector line (21),

--to which each properly working detector (D_i) feeds an output
5 signal corresponding to the superimposing of its pulse
rate (N_i) and its offset (O_{di}), and

--which feeds to a superordinated unit (23) a sum signal
corresponding to the superimposing of the output signals,

10 ---with the superordinated unit (23) deriving, on the basis
of the sum signal, a measurement signal and/or a status
of the measuring device.

3. Radiometric measuring device as claimed in claim 1 or 2,
wherein

15 - a series of detectors (D_i) is provided, and

- the collector line (21) begins at a first detector of the
series,

- leads from there from one detector (D_i) to the detector
(D_{i+1}) neighboring such, and from the last detector to the
20 superordinated unit (23).

4. Radiometric measuring device as claimed in claim 1 or 2,
wherein each detector (D_i) comprises a scintillator (7) and
a photomultiplier (9) appended thereto.

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5. Radiometric measuring device as claimed in claim 4, wherein
the offset-generators (19) send periodic reference light
flashes through the scintillator (7) via a light conductor
(49).

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6. Radiometric measuring device as claimed in claim 3, wherein
the superordinated unit (23) is integrated in the last
detector of the series.

7. Method for measuring a physical variable with a radiometric measuring device as claimed in one of the preceding claims, wherein

- 5 - a desired value (O_{si} , O_{di}) for an offset is assigned to each detector, the offset generators (19) of the detectors (D_i) generate the desired value, when the detector is working properly, and the desired value is greater than the sum of the maximum expected pulse rates (N_i^{max}) for the detectors (D_i), and wherein
- 10 - the superordinated unit (23) determines a total count rate (G) on the basis of the sum signal,
- forms the difference (D) between this total count rate (G) and a count rate corresponding to the sum of the desired values (O_{si} , O_{di}) of the offsets,
- 15 - recognizes, that an error is present, when the difference (D) is negative, and
- in the case of positive difference (D), derives a measurement signal.

20 8. Method for measuring a physical variable as claimed in claim 7, wherein, in the case of a negative difference (D), it is determined on the basis of a mathematical method (e.g. difference), which of the detectors (D_i) is malfunctioning.

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9. Radiometric measuring device for mounting at a container (3) fillable with a filling substance (1), comprising

- a radioactive source (5), which, during operation, sends radioactive radiation through the container (3),
- 30 - first and second detectors (D_1 , D_2),
- which serve for registering radiation passing through the container (3) and for producing an electric pulse rate (N_1 , N_2) corresponding to the registered radiation,
- an offset-generator (19), which superimposes on the pulse

rate (N_1) of the first detector (D_1) an offset (O_1) reflecting a status of the first detector (D_1), and,
- integrated in the second detector (D_2), a superordinated unit (23),
5 --with which the first detector (D_1) is connected via a connecting line (37),
---via which the first detector (D_1) feeds an output signal corresponding to the superpositioning of the pulse rate (N_1) and the offset (O_1),
10 --to which the pulse rate (N_2) and a status of the second detector (D_2) are fed, and
--which, on the basis of the incoming signals, derives a measurement signal and/or a status of the measuring device.

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10. Radiometric measuring device for mounting at a container (3) fillable with a filling substance (1), comprising
- a radioactive source (5), which, during operation, sends radioactive radiation through the container (3),
20 - first and second detectors (D_1 , D_2),
--which serve for registering radiation passing through the container (3) and for producing an electric pulse rate (N_1 , N_2) corresponding to the registered radiation and for transmitting an output signal corresponding to the pulse
25 rate (N_1 , N_2) to a superordinated unit (23),
- wherein the source (5) has a strength, in the case of which, for each detector (D_1 , D_2), always a minimum pulse rate (N_i^{\min}) greater than zero is to be expected,
- wherein, in each detector (D_1 , D_2), a turn-off switch (45)
30 is provided, which suppresses transmission of the output signal to the superordinated unit (23), when the detector (D_i) is malfunctioning, and
- wherein the superordinated unit (23) derives a measurement signal and/or a status of the measuring device on the basis

of the output signals.